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ABSTRACT

A report is given of an analysis of costs and benefits of scoliosis screening tests given to children in the 9th and 10th grades. For comparison, an analysis is included on the effectiveness of tests in grades 5 through 8. Information was collected on the number of children in the State of Washington who underwent either brace treatment or surgical treatment correction for scoliosis. An analysis of cost effectiveness of screening indicated that the 8th grade is the most cost effective and the 6th grade the least. A recommendation is made that school districts should no longer require screening tests at the 10th grade level. (JD)

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SPI

DR. FRANK B. BROUILLET — Superintendent of Public Instruction

December 23, 1987

To: Members of the Washington State Legislature

From: Dr. Frank B. Brouillet

Re: Scoliosis Screening Cost/Benefit Analysis Report

In 1985, RCW 28A.31.130 was amended to provide for screening for grades 9 and 10. In addition RCW 28A.31.139 stipulated that screening could be waived by SPI after July 1, 1987 and after conducting a cost/benefit analysis of such screening for school years 1985-86 and 1986-87.

The cost/benefit analysis was completed in early December. The study was done by Drs. Robert L. Davis and Samuel Milham, Jr., Chronic Disease Epidemiology, Department of Social & Health Services. They recommended waiving screening for grade 10. Attached for your information is a copy of their analysis.

The school districts have been notified that they are no longer required to conduct screening at grade 10. A copy of Bulletin No. 40-87 informing the school district staff of the waiver is attached.

For additional copies of this report or further information, please contact:

Judy Hartmann
Administrative Assistant for Governmental Liaison
Old Capitol Building, FG-11
Olympia, WA 98504
(206) 586-6906, SCAN 321-6906

Old Capitol Building FG-11 Olympia, Washington 98504-3211

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SUPPORT SERVICES PROGRAMS

To: Judith Maire, M.N., CRN.
Health Services Supervisor
Superintentent of Public Instruction

From: Robert L. Davis, M.D.
Samuel Milham, Jr. M.D., M.P.H.
Chronic Disease Epidemiology
Division of Health

Subject: School Scoliosis Screening Program

Here is the cost-benefit analysis you requested. I have broken down the analysis into the cost of finding a particular case of scoliosis that required either surgery or bracing. Because there are many children who require neither of these interventions after being referred for medical evaluation, I have ignored those children who are "followed only" from the benefit analysis. Indeed, one might argue reasonably that these children should be entered into the analysis if only to look at the negative aspect of the screening program, i.e. unnecessary x-rays, parental anxiety, cost of repeated medical evaluations, school-time lost, etc.

I have further stratified the analysis with regards to specific grade. I know you requested an analysis of the 9th and 10th grades; the 5th through 8th grades are included for comparison only.

Table 2 on the following page shows the cost per case found, for grades 5 through 10. Because the natural history of scoliosis is incomplete, there were certain assumptions that were necessary to make to adequately compute these figures. These assumptions are described for you in detail below.

To start our analysis I needed to know the number of children in the state of Washington who underwent either brace treatment or surgical correction for their scoliosis. The data regarding surgical correction was available to me for the years 1985 and 1986 via the CHARS file.

We used the CHARS file and pulled a listing of all the cases of congenital and/or idiopathic scoliosis which underwent surgical correction during the years 1985 and 1986. During these two years there were approximately 70 children age 18 or under who had surgical correction - an average of 35 operations per year in the state of Washington.

Surgery for scoliosis is performed in hospital. An accurate count for all children who underwent this therapy was available as noted above. However, bracing is done on an outpatient basis and no established method exists for counting the total number of braced children in the state of Washington for 1985 and 1986. We, therefore, made the following assumption based on review of the literature in order to calculate the number of braced children (1):

(# of surgeries, male) x 4 = # of males braced
(# of surgeries, female) x 9 = # of females braced

This says that for every female who required surgery, 9 required bracing. For every male requiring surgery, 4 required bracing. The reason more females than males are braced is probably due to the higher disease rate in females. Exactly why more females have the milder form of the disease is unknown.

Table 1
Results from the CHARS data

GRADE	# SURGERY	# BRACED (Calculated)	TOTAL
5	6	35	41
6	2	13	15
7	13	107	120
8	21	154	175
9	14	96	110
10	4	26	30
Totals	60	431	491

From the time of diagnosis of scoliosis, there is approximately a 6 - 12 month lag time before bracing and a 12 - 18 month lag time until surgery. Therefore, in this cost

analysis we have assumed, for ease of calculation, a one-year lag time for both surgery and bracing. That is, children who undergo bracing or surgery in the 7th grade will be assumed to have been diagnosed during the 6th grade(2).

Table 2
Breakdown of cost of the Scoliosis Screening Program
Per case found, 1985 and 1986

GRADE	TOTAL COST 1985 & 1986	TOTAL CASES 1985 & 1986	COST (per case)
5	115700	41	2822
6	109684	15	7312
7	110658	120	922
8	109074	175	623
9	115342	110	1048
10	115878	30	3863
Total	676336	491	1377

The cost of finding a case of scoliosis, averaged over all grades, is $1377. In this analysis 8th grade is the most cost effective and 6th grade the least.

In terms of sex differences, there was only one male who required surgery under the age of 14. This suggests that if screening was eliminated for males in the 5th and 6th grades, the number of cases missed would be minimal.

It may be more cost effective to screen on an every other year basis. This analysis suggests screening in the 5th, 7th, and 9th grades - a schedule which might help reduce many of the false positives generated by the present yearly screening schedule. Research published last year in Sweden concluded that screening in the 4th and 8th grade was sufficient to detect scoliosis that required treatment (3). Dr. Milham and I are currently involved in research regarding this question.

In summary, the difference in the cost effectiveness of the 9th and 10th grades is striking. In analyzing this data, we recommend elimination of scoliosis screening in the 10th grade. This recommendation agrees with other published findings which show the ineffectiveness and relative high cost of screening older adolescents for scoliosis (4,5).

References

1.Results of a Survey by Mailed Questionnaire. University of Kansas Medical Center. Marc Asher, M.D. Presented to The Scoliosis Screening Symposium, September 21 - 25, 1986.

2."Scoliosis: Incidence and Natural History. A Prospective Epidemiologic Study." Rogala, et al. Journal of Bone and Joint Surgery. March 1978, Vol 60A, No.2.

3."School Screening for Adolescent Idiopathic Scoliosis" Bremberg et al. Journal of Pediatric Orthopedics. Vol 6. 1986

4."Age and Sex-specific Prevalence of Scoliosis and the Value of School Screening Programs" Morais et al. American Journal of Public Health. Dec. 1985. Vol. 75, No. 12.

5."Adolescent Idiopathic Scoliosis: Epidemiology and Treatment Outcome in a Large Cohort of Children Six Years after Screening." Robitaille et al. International Journal of Epidemiology. Vol 13, No. 3.1984.

DR. FRANK B. BROUILLET Superintendent of Public Instruction

December 18, 1987

(X) Action Required
Date Due: 10-1-88
( ) Informational

BULLETIN NO. 40-87 SPECIAL SERVICES AND SUPPORT PROGRAMS

TO: Educational Service District Superintendents
Chief School District Administrators
Principals of Elementary & Secondary Schools
Scoliosis Screening Program Supervisors/School Nurse Supervisors
Health Departments Providing School Nursing

FROM: Dr. Frank B. Brouillet, State Superintendent of Public Instruction

RE: Scoliosis Screening and Reporting for 1987-88 School Year

With the 1985-86 school year, the Legislature made several changes in the scoliosis screening law (RCW 28A.31.130-142). The principle change was to extend screening to 9th and 10th grade students. In addition, after July 1, 1987, SPI was given the authority to waive screening for scoliosis for grades 9 and/or 10. The decision to continue or waive screening of those two grades was to be based upon a cost benefit analysis of such screening for school years 1985-86 and 1986-87. This cost/benefit analysis was mandated by the legislature. The analysis has been completed. Based on the analysis and at the recommendations of Drs. Robert Davis and Samuel Milham of the Chronic Disease Epidemiology section, DSHS, scoliosis/kyphosis screening is waived for grade 10 only. Screening continues to be required, by law, for students in grades 5, 6, 7, 8 and 9.

Drs. Davis and Milham will conduct an additional study to determine which grades should be screened to yield the most cost effective screening program and hopefully, decrease the number of false positives from the current screening schedule. A copy of the complete cost/benefit analysis for school years 1985-86 and 1986-87 is available from Judy Maire (206) 753-2744 or SCAN 234-2744 on your request. A summary of the state screening report for school year 1986-87 and the cost of screening per case for 1985-86 is attached for your information.

The Scoliosis/Kyphosis Screening Report Form (SPI M-873) is being revised again to gather information for additional cost/benefit analysis. No other reporting will be necessary. Copies of the new report form will be sent to the scoliosis screening program supervisors/school nurse supervisors in each school district as soon as the revised form is available.

Old Capitol Building, FG-11, Olympia, Washington 98504-3911

Treatment Information

In order to allow time for you to obtain information on follow-up and treatment of students referred from the 1987-88 screening, your Scoliosis/ Kyphosis Screening Report is not due until October 1, 1988. This will allow treatment and follow-up information to be obtained on those students screened and referred late in the 1987-88 school year. This information may not be available until the fall when the student returns to school. It is important that the information sent to SPI be accurate and complete and that school district staff have a follow-up system for securing information on referrals and those in treatment. Following your 1987-88 screening and follow up, a report form is to be completed for each school and forwarded to the Health Services Supervisor. If you have referral follow-up information available before October 1, the report can be submitted as soon as completed.

Your cooperation is appreciated. All students developing scoliosis in the school years need to be identified effectively and efficiently. It is possible that your efforts in follow-up and reporting will result in fewer screenings in the years to come, if screening can be limited to the most likely time to identify early scoliosis or kyphosis. This would produce additional savings in time and money to school districts. In advance, we thank you for compiling the requested data.

Please call Judith A. Maire, Health Services Supervisor, if you have any questions or comments.

DIVISION OF SPECIAL SERVICES
AND SUPPORT PROGRAMS

Judy Schrag
Assistant Superintendent

June Peck, Director
Support Services and Special Programs

Judith A. Maire, M.N., ARNP
Health Services Supervisor

FBB:ljr

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Attachment

SCOLIOSIS/KYPHOSIS SCREENING REPORT

STATE SUMMARY

	TOTAL SCREENED		REFERRED TO MD FOR EVALUATION		IN TREATMENT		FOLLOWUP BY MD		FOLLOWUP BY SCHOOL	
	BOYS	GIRLS	BOYS	GIRLS	BOYS	GIRLS	BOYS	GIRLS	BOYS	GIRLS
GRADE 5	26,391	24,568	1,178	1,251	60	116	330	426	924	990
GRADE 6	25,638	24,179	1,218	1,494	80	183	368	528	867	1,017
GRADE 7	25,740	24,579	1,167	1,377	123	234	381	583	728	893
GRADE 8	26,377	24,916	1,313	1,584	120	257	403	609	861	904
GRADE 9	28,133	26,098	1,346	1,564	177	375	478	736	829	791
GRADE 10	25,251	23,162	1,113	1,298	142	266	361	631	292	244
TOTAL **	157,530	147,502	7,335	8,568	702	1,431	2,321	3,513	4,500	4,839

	BOYS	GIRLS
NUMBER REFERRED FOR KYPHOSIS.	586	366
NUMBER IN TREATMENT FOR KYPHOSIS.	122	112
9TH GRADERS NEWLY DIAGNOSED WITH THIS SCREENING.	424	477
10TH GRACERS NEWLY DIAGNOSED WITH THIS SCREENING.	353	348

Breakdown of cost of the Scoliosis Screening Program Per case found, 1985 and 1986

GRADE	TOTAL COST 1985 & 1986	TOTAL CASES 1985 & 1986	COST (per case)
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